Disentangling the causal train of thought: The use of dispositional cues to causality in children's judgments of mechanical interactions

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THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

- Dispositional theories: causation is an interaction between agents and patients endowed with intrinsic dispositions[1]
- Dispositional schemas → asymmetric role distribution of cause- and effect-object[2]
- Our first model of cause and effect is our embodied experience of manipulating objects

⟶The more a situation has in common with that „action-object-prototype", the more likely it is viewed as causal

- This study was modelled after White's (2013)[3] study:
  - 15 prototypical features
  - 40 written descriptors of causal events
  - More causal features -> higher likelihood of causal rating

Current study:

- Eight prototypical features: Activity, two entities, agent moves first, agent moves toward/focuses on patient, contact, effect, immediate effect, effect in patient
- Instead of verbal descriptors we used videos

Based on theoretical insights and the status quo of research, we hypothesize that:

- Events are less likely rated as causal if lacking one or more of the 8 cues
- Cause and effect is interpreted asymmetrically
- Children follow dispositional core schema stronger than adults and their causal judgements correspond less to real phenomena

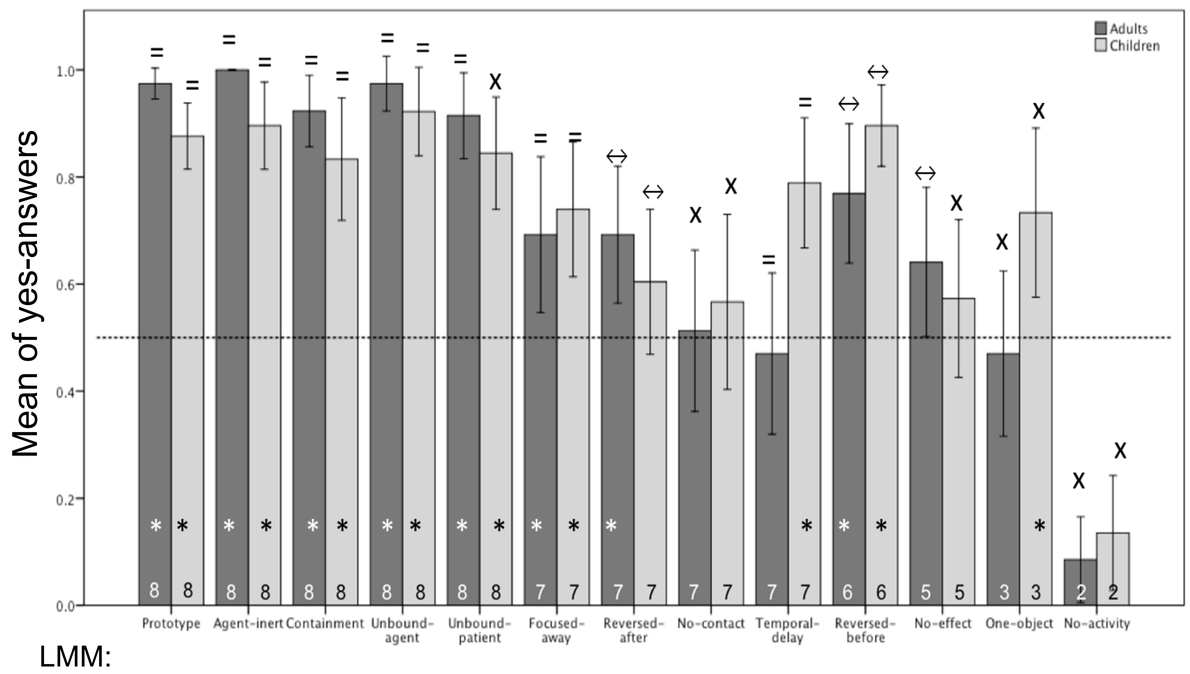
METHODS

Study description:

- A sample of 62 children (mean age = 7.9, *SD* = 3.7; 28 male and 34 female) and 39 adults (mean age = 23.8, *SD* = 3.7; 18 male and 21 female) were tested
- Participants were presented with a prototypical collision event and 12 variations thereof
- After every video they were asked to judge causality ("Was something caused?" – "Yes" or "No")
- Children were first trained on the meaning of the word causality
- Children were tested in a between-participants design (seeing half of the videos) and adults in a within-participants design

	Event	Activity	Two entities	Agent moves first	Agent moves toward / focuses on patient	Contact	Effect	Immediate effect	Effect in patient	Total
	Prototype	x	x	x	x	x	x	x	x	8
Set A	Agent-inert	x	x	x	x	x	x	x	x	8
	Focused-away	x	x	x	-	x	x	x	x	7
	Reversed-after	x	x	x	x	x	x	x	-	7
	Reversed-before	x	x	-	-	x	x	x	x	6
	No-effect	x	x	x	x	x	-	-	-	5
	No-activity	-	x	-	-	x	-	-	-	2
Set B	Containment	x	x	x	x	x	x	x	x	8
	Unbound agent	x	x	x	x	x	x	x	x	8
	Unbound patient	x	x	x	x	x	x	x	x	8
	No-contact	x	x	x	x	-	x	x	x	7
	Temporal delay	x	x	x	x	x	x	-	x	7
	One-object	x	-	-	-	-	x	x	-	3

RESULTS



Legend:
8 number of cues
* Significantly higher than chance
--- 0.5 chance level

Interpretation of cause and effect:
= prototypical dispositional interpretation
↔ "switched dispositional interpretation of cause/effect in relation to prototype event"
× "no reliable dispositional schema"

LMM:

- Significant interaction between number of cues and age
- Significant effect for age
- Significant effect for cues

Pearson correlations with number of cues and causal judgment:

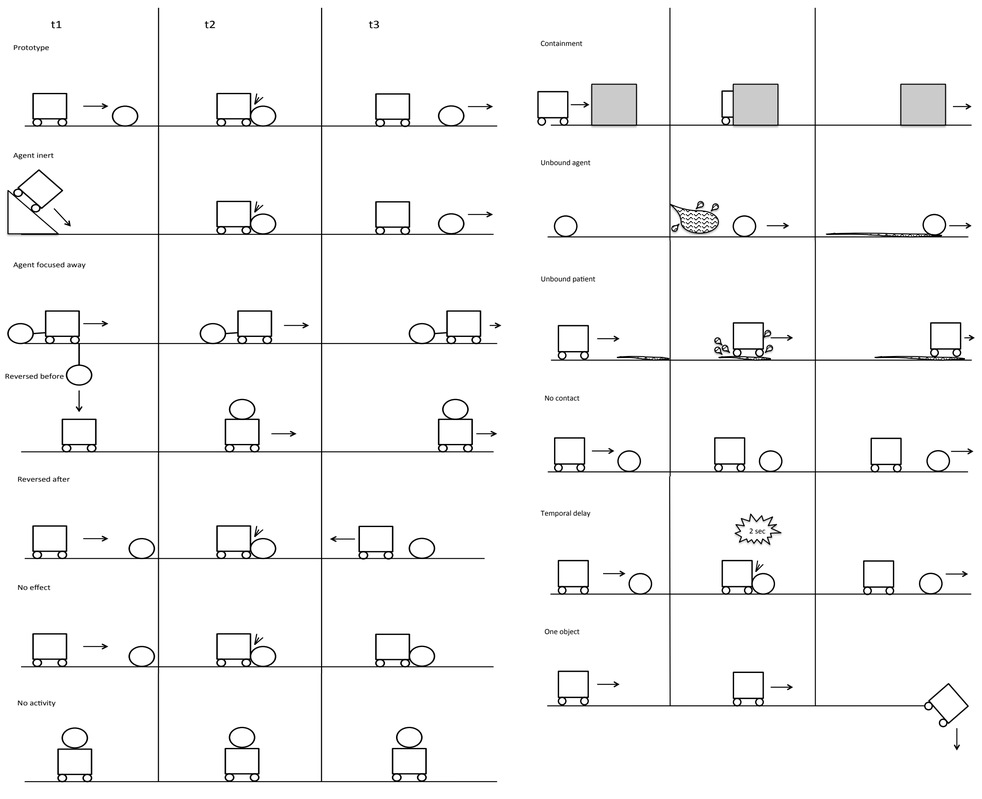
- Adults: $r(544) = .51$, $p < .001$
- Children: $r(432) = .41$, $p < .001$
- Comparison: $z = 2.11$, $p = .035$

DISCUSSION

- Adults and children relied on dispositional causal schemas for causal judgments
- The fewer cues in an event, the less adults and children rated it as causal
- Adults and children interpretred the events asymmetric
- Adult's judgments more systematically dispositional than children's

This study implies that adults and children judge causality by using an embodied causal „action-on-object" schema

Reference
[1]E.g., Wolff, P. (2007). Representing causation. Journal of Experimental Psychology , 136 (1), 82-111.
[2]White, P. A. (2006). The causal asymmetry. Psychological Review, 113, 132–147.
[3]White, P. A. (2013). Singular clues to causality and their use in human causal judgement. Cognitive Science, 38 (1), 38-75.



ISSBD 24th Biennial Meeting of the International Society for the Study of Behavioural Development, Vilnius, Lithuania, July 10-14, 2016

Swiss National Science Foundation